

**REMARKS****Summary of the Office Action**

Claims 1 and 3 are rejected under 35 U.S.C. § 102(b), as being anticipated by U.S. Patent No. 4,195,699 to Rogers et al. ("Rogers").

Claims 1 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rogers in view of U.S. Patent No. 5,934,387 to Tuunanen ("Tuunanen").

Claims 2 and 4-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rogers in view of Tuunanen, and further in view of U.S. Patent No. 5,757,358 to Osga ("Osga").

**Summary of the Response to the Office Action**

Applicants have amended claims 1, 3 and 6 to correct spelling.

Claims 1-7 are pending.

**All Claims Define Allowable Subject Matter**

Claims 1 and 3 are rejected under 35 U.S.C. § 102(b), as being anticipated Rogers. Applicants respectfully traverse the rejection under 35 U.S.C. § 102(b), of claims 1 and 3.

Claim 1 recites a method of controlling rock drilling, including adjusting at least one operating parameter of drilling to accomplish a desired control operation. The adjusting step includes providing an operating system of a control unit with at least two simultaneously active control modes with different control strategies. Each control mode determines at least one criterion to be measured during drilling, a threshold value for a measurement result, and at least one adjustable operating parameter. The adjusting step further includes prioritizing one control

mode over the other control modes, and calculating, based on the measurement results, control values for the operating parameters to be adjusted in the control unit in order to automatically control the drilling such that the control strategy of the prioritized control mode is weighted relative to the other control modes.

Claim 3 recites a control system for a rock drilling apparatus, including an operating system for a control unit. The operating system includes at least two simultaneously active preformed control modes with different control strategies. Each control mode determines at least one criterion to be measured during the drilling, a threshold value for a measurement result, and at least one adjustable operating parameter, such that one control mode can be prioritized over the other control modes. The control unit is arranged to automatically adjust, based on the measurement results, the operating parameters determined by the control modes such that the drilling result according to the prioritized control mode is weighted over the other control modes.

In contrast, Rogers discloses a control system including two drilling parameters- namely drill thrust and drill speed. Applicant submits that drill thrust and drill speed are not control modes of independent claims 1 and 3, which recite “control modes with different control strategies” and “each control mode determining at least one criterion to be measured during drilling, a threshold value for a measurement result, and at least one adjustable operating parameter.” In Rogers, one single drilling parameter does not include any strategy for controlling drilling. Moreover, since the drill thrust and drill speed of Rogers are both adjustable drilling parameters, drill thrust and drill speed of Rogers do not also determine some other adjustable parameters.

The attached page of the New Oxford Dictionary of English defines the term “mode” as “a way or manner in which something occurs or is experienced, expressed or done,” and further as “an option allowing a change in the method of operation of a device.” This is what is meant by the terms of the present claims. The cited dictionary further defines the term “parameter” as “a numerical or other measurable factor forming one of a set that defines a system or sets the conditions of its operation.” Pages 1 and 8 of Applicants’ specification describe that the operation parameters of rock drilling may include impact pressure, feed pressure, feed flow, rotation pressure medium flow, rotation pressure, and flushing pressure and flow. Thrust (feed) and drill speed are also called drilling parameters in Rogers, consistent with the present application and the cited dictionary. Thus, the meaning of the terms “mode” and “parameter” are well known to one of ordinary skill in the art. Applicant submits that the Office Action’s interpretation of these terms are not consistent with the proper meaning.

On pages 5 and 6 of Applicants’ specification, examples of different control modes are presented. The control modes may include, for example, the drilling efficiency mode, quality mode, cost mode and optimization mode. However, in Rogers, only one control mode can be found. See, for example, the “Summary of the invention” of Rogers at column 1. The strategy of this single mode is “optimizing the rate of penetration of a drill.” Because Rogers emphasizes through the whole document the importance of this single strategy, it would be against the teaching of Rogers to use at least two simultaneously active control modes with different control strategies.

Since Rogers does not disclose at least two simultaneously active control modes, Rogers cannot disclose weighting the importance of one control mode by prioritizing it, and still keep

the other control modes simultaneously active but having less influence to the control than the weighted control mode.

On the other hand, Rogers teaches that the variables drill speed and thrust have equal importance when optimizing the penetration rate. If thrust and drill speed were considered to be control modes as the Office Action suggests, Rogers would still not show the present invention, since Rogers does not disclose prioritizing of one of them over the other, but rather teaches that thrust and drill speed have equal importance.

Thus, Applicants respectfully submit that Rogers does not teach or suggest the features of control modes with different control strategies, wherein each control mode determines at least one criterion to be measured during the drilling, a threshold value for a measurement result, and at least one adjustable operating parameter, and one control mode can be prioritized over the other control modes, as recited in claims 1 and 3. Moreover, Applicants submit that Rogers does not teach or suggest the features of calculating, based on the measurement results, control values for the operating parameters to be adjusted in the control unit in order to automatically control the drilling such that the control strategy of the prioritized control mode is weighted relative to the other control modes, as recited in claim 1; or a control unit that is arranged to automatically adjust, based on the measurement results, the operating parameters determined by the control modes such that the drilling result according to the prioritized control mode is weighted over the other control modes, as recited in claim 3. Accordingly, it is requested that the rejection under 35 U.S.C. § 102(b), of claims 1 and 3, be withdrawn.

Claims 1 and 3 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rogers in view of Tuunanen. Applicants respectfully traverse the rejection under 35 U.S.C. § 103(a), of

claims 1 and 3. Applicant submits that Tuunanen fails to overcome the above-described deficiencies of Rogers. Specifically, Tuunanen does not teach or suggest the features of control modes with different control strategies, wherein each control mode determines at least one criterion to be measured during the drilling, a threshold value for a measurement result, and at least one adjustable operating parameter, and one control mode can be prioritized over the other control modes, as recited in claims 1 and 3. Moreover, Tuunanen does not teach or suggest the features of calculating, based on the measurement results, control values for the operating parameters to be adjusted in the control unit in order to automatically control the drilling such that the control strategy of the prioritized control mode is weighted relative to the other control modes, as recited in claim 1; or a control unit that is arranged to automatically adjust, based on the measurement results, the operating parameters determined by the control modes such that the drilling result according to the prioritized control mode is weighted over the other control modes, as recited in claim 3. Accordingly, it is requested that the rejection under 35 U.S.C. § 103(a), of claims 1 and 3, be withdrawn.

Claims 2 and 4-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Rogers in view of Tuunanen, and further in view of Osga. Applicant submits that Osga fails to overcome the above-described deficiencies of Rogers and Tuunanen. Claim 2 depends from claim 1, and claims 4-7 depend from claim 3. The dependent claims recite the same combination of allowable features recited in the respective independent claims, as well as additional features that define over the prior art. For example, claim 4 is directed to weighting of control modes calculated depending on the distance to the control modes places in predetermined points. In contrast, Osga relates to a selection aid. In Osga, symbols/objects are presented in a computer

display and the symbol/object lying closest to a cursor is visually indicated to a user before a selection is made. See column 4, lines 3-14 of Osga. The only teaching in Osga is to select the closest object. Moreover, in Osga, the symbols/objects may be positioned anywhere on the display screen. There is no indication in Osga to place the symbols/objects beforehand into a certain order, place or pattern. On the contrary, at column 1, line 66-67, Osga describes that the symbols represent real world objects. Therefore, if the place of the objects were modified from the place where they actually are, that would be manipulation of reality. Moreover, in Osga there is no operation area in the sense of claim 4, but rather Osga only teaches that every single independent symbol/object has an own selection area.

Accordingly, it is requested that the rejection under 35 U.S.C. § 103(a), of claims 2 and 4-7, be withdrawn.

**CONCLUSION**

Applicants respectfully request entry of the amendment under 37 C.F.R. § 1.116 by the Examiner, placing all pending claims in condition for allowance. Applicants submit that the amendment does not raise new issues or necessitate additional search of the art by the Examiner.

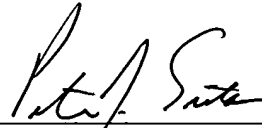
Should the Examiner feel that there are any issues outstanding after consideration of this response, the Examiner is invited to contact Applicants' undersigned representative to expedite the prosecution.

If there are any other fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-0573. If a fee is required for an extension of time under 37 C.F.R. 1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account. Respectfully submitted,

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Dated: September 30, 2005

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# *The* NEW OXFORD *Dictionary of* ENGLISH

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tropical America and noted for its mimicry of the calls and songs of other birds.

● Family Mimidae (the **mockingbird** family): three genera and several species, especially the **northern mockingbird** (*Mimus polyglottos*), of North America. The mockingbird family also includes the cabirids, thrashers, and tremblers.

**mock moon** ► noun Astronomy a paraselene.

**mockney** ► noun (mass noun) Brit. informal a form of speech perceived as an affected imitation of cockney in accent and vocabulary.

**mock orange** ► noun a bushy shrub of north temperate regions, which is cultivated for its strongly scented white flowers, the perfume of which resembles orange blossom.

● Genus *Philadelphus*, family Hydrangeaceae (formerly Philadelphaceae): several species and hybrids, in particular *P. coronarius*.

**mock sun** ► noun Astronomy a parhelion.

**mock turtle soup** ► noun (mass noun) imitation turtle soup made from a calf's head.

**mock-up** ► noun a model or replica of a machine or structure, used for instructional or experimental purposes.

■ an arrangement of text and pictures to be printed: a mock-up of the following day's front page.

**mocky** US informal, dated, offensive, ► noun (pl. -ies) a Jew.

► adjective Jewish.

— ORIGIN 1930s: perhaps from Yiddish *makhe* 'a plague'.

**moçock** /mɒʊ'kɒk/ ► noun N. Amer. a container resembling a basket made from birchbark.

— ORIGIN late 18th cent.: from an American Indian language.

**MOD** ► abbreviation for (in the UK) Ministry of Defence.

**Mod** ► noun a Highland meeting for Gaelic literary and musical competitions.

— ORIGIN from Scottish Gaelic *mòd*.

**mod'** ► adjective informal modern.

► noun Brit. (especially in the early 1960s) a young person of a subculture characterized by a smart stylish appearance, the riding of motor scooters, and a liking for soul music.

— ORIGIN abbreviation of **MODERN** or **MODERNIST**.

**mod'** ► preposition Mathematics another term for **MODULO**.

**mod'** ► noun informal (usu. *mods*) short for **MODIFICATION**.

**modacrylic** /ˌmɒdə'krɪlɪk/ ► adjective of or denoting a synthetic textile fibre which is a polymer containing a high proportion of units derived from acrylonitrile.

► noun (mass noun) a textile fibre of this kind.

— ORIGIN 1950s: from *modified* (past participle of **MODIFY**) + **ACRYLIC**.

**modal** /'mɒd(ə)l/ ► adjective 1 of or relating to mode or form as opposed to substance.

2 Grammar of or denoting the mood of a verb.

■ relating to a modal verb.

3 Statistics of or relating to a mode; occurring most frequently in a sample or population.

4 Music of or denoting music using melodies or harmonies based on modes other than the ordinary major and minor scales.

5 Logic (of a proposition) in which the predicate is affirmed of the subject with some qualification, or which involves the affirmation of possibility, impossibility, necessity, or contingency.

► noun Grammar a modal word or construction.

— DERIVATIVES **modally** adverb.

— ORIGIN mid 16th cent. (in sense 5): from medieval Latin *modalis*, from Latin *modus* (see **MODE**).

**modalism** ► noun (mass noun) 1 Theology the doctrine that the persons of the Trinity represent only three modes or aspects of the divine revelation, not distinct and coexisting parts of the divine nature.

2 Music the use of modal melodies and harmonies.

— DERIVATIVES **modalist** noun & adjective.

**modality** ► noun (pl. -ies) 1 (mass noun) modal quality: the harmony had a touch of modality.

2 a particular mode in which something exists or is experienced or expressed.

■ a particular method or procedure: they addressed questions concerning the modalities of Soviet troop withdrawals. ■ a particular form of sensory perception: the visual and auditory modalities.

— ORIGIN early 17th cent.: from medieval Latin *modalitas*, from *modalis* (see **MODAL**).

**modal verb** ► noun Grammar an auxiliary verb that

expresses necessity or possibility. English modal verbs include *must*, *shall*, *will*, *should*, *would*, *can*, *could*, *may*, and *might*.

**mod cons** ► plural noun Brit. informal the amenities and appliances characteristic of a well-equipped modern house that contribute to an easier and more comfortable way of life: the property has many interesting features and all mod cons.

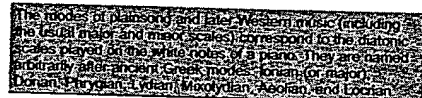
**mode** ► noun 1 a way or manner in which something occurs or is experienced, expressed, or done: his preferred mode of travel was a kayak | differences between language modes, namely speech and writing.

■ an option allowing a change in the method of operation of a device, especially a camera: a camcorder in automatic mode. ■ Computing a way of operating or using a system: some computers provide several so-called processor modes. ■ Physics any of the distinct kinds or patterns of vibration of an oscillating system. ■ Logic the character of a modal proposition (whether necessary, contingent, possible, or impossible). ■ Logic & Grammar another term for **MOOD**.

2 a fashion or style in clothes, art, literature, etc.: in the Seventies the mode for active wear took hold.

3 Statistics the value that occurs most frequently in a given set of data.

4 Music a set of musical notes forming a scale and from which melodies and harmonies are constructed.



— ORIGIN late Middle English (in the musical and grammatical senses): from Latin *modus* 'measure', from an Indo-European root shared by **METE**; compare with **MOOD**.

**model** ► noun 1 a three-dimensional representation of a person or thing or of a proposed structure, typically on a smaller scale than the original: a model of St Paul's Cathedral | [as modifier] a model aeroplane.

■ (in sculpture) a figure or object made in clay or wax, to be reproduced in another more durable material.

2 a system or thing used as an example to follow or imitate: the law became a model for dozens of laws banning nondegradable plastic products | [as modifier] a model farm.

■ a simplified description, especially a mathematical one, of a system or process, to assist calculations and predictions: a statistical model used for predicting the survival rates of endangered species. ■ (model of) a person or thing regarded as an excellent example of a specified quality: as she grew older, she became a model of self-control | [as modifier] he was a model husband and father. ■ (model for) an actual person or place on which a specified fictional character or location is based: Preston was the model for Coketown in 'Hard Times'. ■ (the Model) the plan for the reorganization of the Parliamentary army, passed by the House of Commons in 1644-5. See also **NEW MODEL ARMY**.

3 a person, typically a woman, employed to display clothes by wearing them.

■ a person employed to pose for an artist, photographer, or sculptor: an artist's model.

4 a particular design or version of a product: changing your car for a new model.

■ a garment or a copy of a garment by a well-known designer.

► verb (modelled, modelling; US modeled, modeling) [with obj.] 1 fashion or shape (a three-dimensional figure or object) in a malleable material such as clay or wax: use the icing to model a house.

■ (in drawing or painting) represent so as to appear three-dimensional: the body of the woman to the right is modelled in softer, ripier forms. ■ (model something on/after) use (especially a system or procedure) as an example to follow or imitate: the research method will be modelled on previous work. ■ (model oneself on) take (someone admired or respected) as an example to copy: he models himself on rock legend Elvis Presley. ■ devise a representation, especially a mathematical one, of (a phenomenon or system): a computer program that can model how smoke behaves.

2 display (clothes) by wearing them.

■ [no obj.] work as a model by displaying clothes or posing for an artist or sculptor.

— DERIVATIVES **modeller** noun.

— ORIGIN late 16th cent. (denoting a set of plans of a building): from French *modèle*, from Italian *modello*, from an alteration of Latin *modulus* (see **MODULUS**).

**model home** ► noun North America SHOW HOUSE.

**modelling** (US **modeling**) ► noun 1 work of a fashion model.

2 the art or activity of making the models.

■ [often with adj. or noun modifier] the dev abstract or mathematical models: modelling and policy analysis.

**model village** ► noun 1 historical a vi a high standard of housing, typical employer for the workforce.

2 a small copy of a village or a collection of famous buildings arranged as a v. built as a tourist attraction.

**modem** /'mɒdəm/ ► noun a combination modulation and demodulation, between the digital data of a computer and analogue signal of a telephone line.

► verb [with obj. and adverbial of direction] to modem.

— ORIGIN mid 20th cent.: blend of demodulator.

**Modena** /'mɒdnə, Italian mo'den northern Italy, north-west of Bologna: (1990).

**moderate** ► adjective average in amount, quality, or degree: we walked at a moderate pace. ■ (of a person, party, or policy) not excessively right- or left-wing: a moderate programme.

► noun /'mɒd(ə)rat/ a person who holds views, especially in politics.

► verb 1 make or become less extreme, rigorous, or violent: [with obj.] I shall moderate criticism | [as adj.] moderating his moderate in the army was now needed more than ever weather has moderated considerably.

2 [with obj.] review (examination paper candidates) in relation to an agreed score to ensure consistency of marking.

3 [with obj.] (in academic and ecclesiastical contexts) preside over (a deliberative body) or at panel moderated by a Harvard University | [no obj.] (especially in the Presbyterian Scotland) preside; act as a moderator.

4 [with obj.] Physics retard (neutron) moderator.

— DERIVATIVES **moderatism** noun.

— ORIGIN late Middle English: from Latin *moderatus*, 'reduced, controlled', from the verb *moderari* related to **MODEST**.

**moderate breeze** ► noun a wind of the Beaufort scale (11-16 knots or 20-30 mph).

**moderate gale** ► noun another term for **GALE**.

**moderately** ► adverb [as submodifier] to extent; quite; fairly: these events were moderately successful | he answered all the questions moderately. ■ in a moderate manner: growth continued within reasonable limits: both hotels are moderately priced.

**moderation** ► noun (mass noun) 1 the act of excess or extremes, especially in one's political opinions: he urged the political moderation.

■ the action of making something less intense, or violent: the union's approach increased dialogue and the moderation of demands.

2 the action or process of moderating papers, results, or candidates.

■ (Moderations) the first public examination for the BA degree at Oxford University.

3 Physics the retardation of neutron moderation.

— PHRASES in moderation within reason not to excess: nuts can be eaten in moderation.

— ORIGIN late Middle English: via Old French *moderatio* (see **MODERATE**).

**moderato** /ˌmɒd(ə)'rɑ:t(ə)u/ Music ► adverb (especially as a direction) at a moderate (postpositive as submodifier) *allegro moderato*.

► noun (pl. -os) a passage marked to be performed in such a way.

— ORIGIN Italian, literally 'moderate'.

**moderator** ► noun 1 an arbitrator or mediator: Egypt managed to assert its role as a regional moderator. ■ a presiding officer, especially a chairman of a meeting.

Chemistry a liquid made by treating acetaldehyde with acid, used medicinally as a sedative, hypnotic, and anticonvulsant.

• A cyclic trimer of acetaldehyde; chem. formula:  $(\text{CH}_3\text{CHO})_3$ .

**paralegal** chiefly N. Amer. ► **noun** a person trained in subsidiary legal matters but not fully qualified as a lawyer.

► **adjective** of or relating to auxiliary aspects of the law.

**paralinguistic** ► **adjective** of, relating to, or denoting paralinguistic or the non-lexical elements of communication by speech.

**paralipomena** /ˌpærəˈlɪpəˈmɪnə/ (also **paraleipomena** /-lɪpə-/) ► **plural noun** (sing. **paraleipomenon**) formal things omitted from a work and added as a supplement.

■ (usu. **Paralipomenon**) **archaic** (in the Vulgate Bible and some other versions) the name of the books of Chronicles, regarded as supplementary to the books of Kings.

— **ORIGIN** late Middle English: via ecclesiastical Latin from Greek *paraleipomena*, from *paraleipein* 'omit', from *para-* 'to one side' + *leipein* 'to leave'.

**paralipsis** /ˌpærəˈlɪpsɪs/ ► **noun** (mass noun) Rhetoric the device of giving emphasis by professing to say little or nothing of a subject, as in not to mention their unpaid debts of several millions.

— **ORIGIN** late 16th cent.: via late Latin from Greek *paralipsis* 'passing over', from *paraleipein* 'omit', from *para-* 'aside' + *leipein* 'to leave'.

**parallax** /ˈpærəlæks/ ► **noun** (mass noun) the effect whereby the position or direction of an object appears to differ when viewed from different positions, e.g. through the viewfinder and the lens of a camera.

■ (count noun) the angular amount of this in a particular case, especially that of a star viewed from different points in the earth's orbit.

— **DERIVATIVES** **parallaxic** **adjective**.

— **ORIGIN** late 16th cent. (also in the general sense 'fact of seeing wrongly'): from French *parallaxe*, from Greek *parallaxis* 'a change', from *parallassein* 'to alternate', based on *allassein* 'to exchange' (from *allos* 'other').

**parallel** ► **adjective** (of lines, planes, surfaces, or objects) side by side and having the same distance continuously between them: *parallel lines never meet* | *the road runs parallel to the Ottawa river*.

■ occurring or existing at the same time or in a similar way: corresponding: a parallel universe | they shared a flat in London while establishing parallel careers.

■ Computing involving the simultaneous performance of operations. ■ of or denoting electrical components or circuits connected to common points at each end, rather than one to another in sequence. The opposite of **SERIES**. ■ S. African of or relating to schools in which two languages are used in separate classes.

► **noun** 1 a person or thing that is similar or analogous to another: a challenge which has no parallel in peacetime this century.

■ a similarity: he points to a parallel between biological evolution and cognitive development. ■ a comparison: he draws a parallel between personal destiny and social forces.

2 (also **parallel of latitude**) each of the imaginary parallel circles of constant latitude on the earth's surface.

■ a corresponding line on a map. ■ Printing two parallel lines (||) as a reference mark.

► **verb** (**paralleled**, **paralleling**) [with obj.] (of something extending in a line) be side by side with (something extending in a line), always keeping the same distance: a big concrete gutter that paralleled the road. ■ be similar or corresponding to (something): US naval and air superiority was paralleled by Soviet superiority in land-based missile systems.

— **PHRASES** **in parallel** occurring at the same time and having some connection. ■ (of electrical components or circuits) connected to common points at each end; not in series.

— **ORIGIN** mid 16th cent.: from French *parallèle*, via Latin from Greek *parallelōs*, from *para-* 'alongside' + *allēlos* 'one another'.

**parallel bars** ► **plural noun** a pair of parallel rails on posts used in gymnastics.

**parallel cousin** ► **noun** the offspring of a parent's sibling; a first cousin.

**parallel distributed processing** (abbrev.: **PDP**) ► **noun** another term for **CONNECTIONISM**.

**parallelepiped** /ˌpærələˈpeɪpɪd, ˌpærələˈleɪpɪd/

► **noun** Geometry a solid body of which each face is a parallelogram.

— **ORIGIN** late 16th cent.: from Greek *parallelēpipedon*, from *parallelōs* 'beside another' + *epipedon* 'plane surface'.

**parallel imports** ► **plural noun** goods imported by unlicensed distributors for sale at less than the manufacturer's official retail price.

— **DERIVATIVES** **parallel importing** **noun**.

**parallelism** ► **noun** (mass noun) the state of being parallel or of corresponding in some way.

■ the use of successive verbal constructions in poetry or prose which correspond in grammatical structure, sound, metre, meaning, etc. ■ the use of parallel processing in computer systems.

— **DERIVATIVES** **parallelistic** **adjective**.

**parallelize** /ˈpærələˌaɪz/ (also **-ise**) ► **verb** [with obj.] Computing adapt (a program) to be suitable for running on a parallel processing system.

— **DERIVATIVES** **parallelization** **noun**.

**parallel market** ► **noun** an unofficial market in goods or currencies, especially in a country with a controlled economy.

**parallelogram** /ˌpærəˈleɪɡrəm/ ► **noun** a four-sided plane rectilinear figure with opposite sides parallel.

— **PHRASES** **parallelogram of forces** a parallelogram illustrating the theorem that if two forces acting at a point are represented in magnitude and direction by two sides of a parallelogram meeting at that point, their resultant is represented by the diagonal drawn from that point.

— **ORIGIN** late 16th cent.: from French *parallélogramme*, via late Latin from Greek *parallelogrammon*, from *parallelōs* 'alongside another' + *grammē* 'line'.

**parallel port** ► **noun** Computing a connector for a device that sends or receives several bits of data simultaneously by using more than one wire.

**parallel processing** ► **noun** (mass noun) a mode of computer operation in which a process is split into parts, which execute simultaneously on different processors attached to the same computer.

**parallel ruler** ► **noun** an instrument for drawing parallel lines, consisting of two or more rulers connected by jointed crosspieces so as to be always parallel, at whatever distance they are set.

**parallel turn** ► **noun** Skiing a turn with the skis kept parallel to each other.

**paralogical** ► **adjective** of or relating to a form of reasoning which does not conform to the rules of logic.

— **DERIVATIVES** **paralogically** **adverb**.

**paralogism** /pəˈrælədʒɪz(ə)m/ ► **noun** Logic a piece of illogical or fallacious reasoning, especially one which appears superficially logical or which the reasoner believes to be logical.

— **DERIVATIVES** **paralogist** **noun**.

— **ORIGIN** mid 16th cent.: from French *paralogisme*, via late Latin from Greek *paralogismos*, from *paralogizesthai* 'reason falsely'.

**paralogous** /pəˈræləɡəs/ ► **adjective** Genetics of or relating to genes that are descended from the same ancestral gene by gene duplication in the course of evolution, especially when present in different species which have diverged after the duplication.

**paralogy** /pəˈrælədʒi/ ► **noun** (mass noun) 1 Genetics the state of being paralogous.

2 paralogical reasoning.

**Paralympics** ► **plural noun** an international athletic competition for disabled athletes.

— **DERIVATIVES** **Paralympic** **adjective**.

— **ORIGIN** 1950s: blend of *paraplegic* (see **PARAPLEGIA**) and *Olympics* (plural of **OLYMPIC**).

**paralyse** (chiefly US also **paralyze**) ► **verb** [with obj.] (often be **paralysed**) cause (a person or part of the body) to become partly or wholly incapable of movement: Mrs Burrows had been paralysed by a stroke | [as adj. **paralysed**] he became partially paralysed.

■ render (someone) unable to think or act normally, especially through panic or fear: some people are paralysed by the thought of failure | [as adj. **paralysing**] her paralysing shyness. ■ bring (a system, place, or organization) to a standstill by causing disruption or chaos: the regional capital was paralysed by a general strike.

— **DERIVATIVES** **paralysingly** **adverb**.

— **ORIGIN** early 19th cent.: from French *paralyser*, from *paralyse* 'paralysis'.

**paralysis** /pəˈrælɪsɪs/ ► **noun** (pl. **paralyses** /-sɪz/) (mass noun) the loss of the ability to move (and sometimes to feel anything) in part or most of the body, typically as a result of illness, poison, or injury.

■ inability to act or function in a person, organization, or place: the paralysis gripping the country.

— **ORIGIN** late Old English, via Latin from Greek *paralysis*, from *paralueshai* 'be disabled at the side', from *para* 'beside' + *luēin* 'loosen'.

**paralysis agitans** /ˈædʒɪtənz/ ► **noun** less common term for **PARKINSON'S DISEASE**.

— **ORIGIN** Latin, literally 'shaking paralysis'.

**paralytic** ► **adjective** of or relating to paralysis: the incidence of paralytic disease.

■ [predic.] informal, chiefly Brit. extremely drunk: a leaving party which left everyone paralytic.

► **noun** a person affected by paralysis.

— **DERIVATIVES** **paralytically** **adverb**.

— **ORIGIN** late Middle English: from Old French *paralytique*, via Latin from Greek *paralutikos* 'relating to paralysis' (see **PARALYSIS**).

**paramagnetic** ► **adjective** (of a substance or body) very weakly attracted by the poles of a magnet, but not retaining any permanent magnetism.

— **DERIVATIVES** **paramagnetism** **noun**.

**Paramaribo** /ˌpærəˈmaɪbəʊ/ the capital of Suriname, a port on the Atlantic coast; pop. 200,920 (est. 1993).

**paramatta** ► **noun** variant spelling of **PARRAMATTA**.

**paramecium** /ˌpærəˈmiːʃəm/ ► **noun** Zoology a single-celled freshwater animal which has a characteristic slipper-like shape and is covered with cilia.

■ Genus *Paramecium*, phylum Ciliophora, kingdom Protista.

— **ORIGIN** mid 18th cent.: modern Latin, from Greek *paramēkēs* 'oval' from *para-* 'against' + *mēkos* 'length'.

**paramedic** ► **noun** a person who is trained to do medical work, especially emergency first aid, but is not a fully qualified doctor.

**paramedical** ► **adjective** of or relating to services and professions which supplement and support medical work but do not require a fully qualified doctor (such as nursing, radiography, emergency first aid, physiotherapy, and dietetics).

**parameter** /pəˈræmɪtə/ ► **noun** technical a numerical or other measurable factor forming one of a set that defines a system or sets the conditions of its operation.

■ Mathematics a quantity whose value is selected for the particular circumstances and in relation to which other variable quantities may be expressed. ■ Statistics a numerical characteristic of a population, as distinct from a statistic of a sample. ■ (in general use) a limit or boundary which defines the scope of a particular process or activity: the parameters within which the media work.

— **ORIGIN** mid 17th cent.: modern Latin, from Greek *para-* 'beside' + *metron* 'measure'.

**USAGE** Until recently use of the word *parameter* was confined to mathematics and related technical fields. Since around the mid-20th century, however, it has been used in non-technical contexts to denote a limiting factor or boundary within which something operates. This use is probably influenced by the word *perimeter*, which has been criticized for being a weakening of the technical sense. However, it is now generally accepted as part of standard English.

**parameterize** /pəˈræmɪtəˌaɪz/ (also **parametrize** /pəˈræmɪtraɪz/) ► **verb** [with obj.] technical describe or represent in terms of a parameter or parameters.

— **DERIVATIVES** **parameterization** **noun**.

**parametric** ► **adjective** of, relating to, or expressed in terms of a parameter or parameters.

■ Statistics assuming the value of a parameter for the purpose of analysis. ■ Electronics relating to or denoting a process in which amplification or frequency conversion is obtained using a device modulated by a pumping frequency, which enables power to be transferred from the pumping frequency to the signal.

**parametric equalizer** ► **noun** an electronic device or computer program which allows any specific part of the frequency range of a signal to be selected and altered in strength.

**paramilitary** ► **adjective** (of an unofficial force) organized similarly to a military force: illegal paramilitary groups.

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